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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,532	01/28/2004	Tsunchiko Nakamura	81880.0113	2226

26021 7590 09/06/2006

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EXAMINER	
ROMAN, LUIS ENRIQUE	
ART UNIT	**PAPER NUMBER**
2836	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/766,532	NAKAMURA, TSUNEHIKO	
	Examiner	Art Unit	
	Luis Roman	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant amendment filed on 06/07/06 has been entered. Accordingly claims 2-5 have been kept original, claim 1 has been amended and no claim has been cancelled. New claims 6-20 were added. It also included remarks/arguments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 5, 6, 12, 14, 18, 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Weldon et al. (US 6108189) in view of Johnson et al. (US 6740853) and Ross et al. (US 5986874).

Regarding claim 1 Weldon et al. discloses an electrostatic chuck (Fig. 2 element 100) comprising:
a circular ceramic plate having an electrostatic attractive electrode (Fig. 2 element 110);
a mounting surface (Fig. 2 element 105) for supporting a wafer formed on one of the main surfaces of the circular ceramic plate;
an annular gas groove formed; on the periphery of the mounting surface in the form of concentric circles (Fig. 4a-b element 162) and an first gas inlet which communicates with the annular gas groove (Fig. 4a-b element 202) ; and
a circular gas recess formed inside the circular ceramic plate (Fig. 4a-b element 115), and a second gas inlet which communicates with the circular gas recess (Fig. 4a-b inlet at the center of element 105).

Weldon et al. does not specifically disclose how the recess area and the annular groove are separated.

Johnson et al. teaches the usage of an annular groove (Fig. 10D element 440), a recess area (Fig. 10 D-E annular area between annular groove 440 and center 205) with an internal ribbing to separate them (Col. 8 lines 33-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Weldon et al. device with the teachings of Johnson et al. because the internal ribbing also enables proper alignment of the concentric conduits, sites for fusing adjacent conduits, and an improved ducting for coolant and gas flow (Johnson et al. Col. 8 lines 33-36).

Weldon et al. in view of Johnson et al. does not disclose and wherein a plurality of dotted protrusions is disposed within both the annular gas groove and the circular gas recess.

Ross et al. teaches the usage of dotted protrusions (Fig. 5-6 elements 48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Weldon et al. in view of Johnson et al. device with the teachings of Ross et al. because using numerous, relatively small raised areas allows the cooling gas to be quickly and evenly distributed across the underside of the wafer (Ross et al. Col. 4 lines 61-63).

Regarding claim 4 Weldon et al. in view of Johnson et al. and Ross et al. discloses an electrostatic chuck according to claim 1.

Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and the annular groove may be 20% accordingly with the requirements desired to lift the wafer.

Regarding claim 5 Weldon et al. in view of Johnson et al. and Ross et al. discloses an electrostatic chuck according to claim 1.

Johnson et al. further discloses wherein the circular ceramic plate has a heating element for heating the wafer buried in the ceramic plate or attached to the other main surface of the ceramic plate (Fig. 11 elements 2, 3).

Regarding claim 6 Weldon et al. in view of Johnson et al. and Ross et al. discloses an electrostatic chuck according to claim 1.
Johnson et al. further discloses wherein the circular ceramic plate comprises at least one from the group consisting of aluminum nitride, silicon carbide and boron nitride which have heat conductivity of not less than 50W/(m-K) (Col. 22 lines 24-31).

Regarding claim 12 Weldon et al. in view of Johnson et al. and Ross et al. discloses an electrostatic chuck according to claim 1.
Johnson et al. further discloses wherein the diameter of the circular gas recess is set to 80 to 90% of the diameter of the mounting surface (Fig. 10D area from outer annular groove 440 and center<notice that the amount of annular rings may be varied>).

Regarding claim 14 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 6.
Johnson et al. further discloses wherein the diameter of the circular gas recess is set to 80 to 90% of the diameter of the mounting surface (Fig. 10D area from outer annular groove 440 and center<notice that the amount of annular rings may be varied>).
(Ross et al. Col. 4 lines 61-63).

Regarding claim 18 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 1.
Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and

the annular groove may be 50% and 66% for the recess area and the annular groove area respectively accordingly with the requirements desired to lift the wafer.

Regarding claim 20 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 6.
Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and the annular groove may be 50% and 66% for the recess area and the annular groove area respectively accordingly with the requirements desired to lift the wafer.

Claims 2, 7, 10, 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Weldon et al. (US 6108189) in view of Johnson et al. (US 6740853), Ross et al. (US 5986874) and Lue et al. (US 5761023).

Regarding claim 2 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 1.
Weldon et al. in view of Johnson et al. and Ross et al. does not disclose wherein the circular gas recess has a diameter, which is set to 70 to 95% of the outer diameter of the mounting surface.
Lue et al. teaches wherein the circular gas recess has a diameter, which is set to 70 to 95% of the outer diameter of the mounting surface (Fig. 3 area of element 74).
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Weldon et al. in view of Johnson et al. and Ross et al. device with the teachings of Lue et al. because it provides to accomplish a gradient in temperature on the wafer, in other words a more selective control of the temperature (Lue et al. Col. 6 lines 36-56).

Regarding claim 7 Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. discloses an electrostatic chuck according to claim 2.
Johnson et al. further discloses wherein the circular ceramic plate comprises at least one from the group consisting of aluminum nitride, silicon carbide and boron nitride which have heat conductivity of not less than 50W/(m-K) (Col. 22 lines 24-31).

Regarding claim 10 Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. discloses an electrostatic chuck according to claim 2.
Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and the annular groove may be 20% accordingly with the requirements desired to lift the wafer.

Regarding claim 19 Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. discloses the electrostatic chuck according to claim 2.
Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and the annular groove may be 50% and 66% for the recess area and the annular groove area respectively accordingly with the requirements desired to lift the wafer.

Claims 3, 9, 11, 13, 15, 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Weldon et al. (US 6108189) in view of Johnson et al. (US 6740853), Ross et al. (US 5986874) and del Puerto et al. (US 5186238).

Regarding claim 3 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 1.

Weldon et al. further discloses where the width of the annular groove may be 1 mm (Col. 17 lines 18-29).
Weldon et al. in view of Johnson et al. and Ross et al. does not disclose wherein the inner rib has a width of 0.5 to 5 mm and the outer rib has a width of 1 to 5 mm.
del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 and 1-5 mm for the inner and outer rib respectively.
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Weldon et al. in view of Johnson et al. and Ross et al. device with the teachings of del Puerto et al. because this relation improves the fluid traveling (Col. 4 lines 61-63). It is well known in the art the finding and usage of the proper ratios in each system to better suit properties of support/wafer.

Regarding claim 9 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 6.
Weldon et al. further discloses where the width of the annular groove may be 1 mm (Col. 17 lines 18-29).
del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 mm and 1-5 mm for the inner and outer rib respectively.

Regarding claim 11 Weldon et al. in view of Johnson et al., Ross et al. and del Puerto et al. discloses the electrostatic chuck according to claim 3.
Ross et al. further discloses that it is to be understood that the actual distribution of the raised areas is subject to considerable variation within the scope of this invention (Col. 4 lines 43-48). It is implicitly disclosed that the density of the dotted protrusion may be such that the contact of the wafer with the ceramic plate through the recess area and the annular groove may be 20% accordingly with the requirements desired to lift the wafer.

Regarding claim 13 Weldon et al. in view of Johnson et al., Ross et al. and del Puerto et al. discloses the electrostatic chuck according to claim 3.
Johnson et al. further discloses wherein the diameter of the circular gas recess is set to 80 to 90% of the diameter of the mounting surface (Fig. 10D area from outer annular groove 440 and center<notice that the amount of annular rings may be varied>).

Regarding claim 15 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 1.
Weldon et al. further discloses where the width of the annular groove may be 1 mm (Col. 17 lines 18-29).
del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 mm and 2-3 mm for inner and outer rib respectively.

Regarding claim 17 Weldon et al. in view of Johnson et al. and Ross et al. discloses the electrostatic chuck according to claim 6.
Weldon et al. further discloses where the width of the annular groove may be 1 mm (Col. 17 lines 18-29).
del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 mm and 2-3 mm for inner and outer rib respectively.

Claims 8, 16, are rejected under 35 U.S.C. §103(a) as being unpatentable over Weldon et al. (US 6108189) in view of Johnson et al. (US 6740853), Ross et al. (US 5986874), Lue et al. (US 5761023) and del Puerto et al. (US 5186238).

Regarding claim 8 Weldon et al. in view of Johnson et al. and Ross et al. and Lue et al. discloses the electrostatic chuck according to claim 1.

Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. does not disclose wherein the inner rib has a width of 0.5 to 5 mm and the outer rib has a width of 1 to 5 mm.

del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 mm and 1-5 mm for the inner and outer rib respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. device with the teachings of del Puerto et al. because this relation improves the fluid traveling (Col. 4 lines 61-63). It is well known in the art the finding and usage of the proper ratios in each system to better suit properties of support/wafer.

Regarding claim 16 Weldon et al. in view of Johnson et al., Ross et al. and Lue et al. discloses the electrostatic chuck according to claim 2.

Weldon et al. further discloses where the width of the annular groove may be 1 mm (Col. 17 lines 18-29).

del Puerto et al. teaches a relation depth/width/pitch of 1/1.2/4 (Col. 4 lines 53-63). As a result by having a groove width of 1 mm the rib width would be 3.33 mm, which falls between 0.5-5 mm and 2-3 mm for inner and outer rib respectively.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is (571) 272 – 5527. The examiner can normally be reached on Mon – Fri from 7:15 AM to 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

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LR/082206

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